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EXAMINER

GRAYBILL, DAVID E

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/907,237

Applicant(s)

TELLKAMP, JOHN P.

Examiner

David E Graybill

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 17-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Claims 17-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2, 3, 5-7 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 contains the trademark "invar" [sic]. Where, as here, a trademark is used in a claim as a limitation to identify a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark cannot be used properly to identify any particular material or product. A trademark is used to identify a source of goods, and not the goods themselves. Thus, a trademark does not identify the goods associated with the trademark.

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In claim 5 the limitation, "said solder layer comprises alloys selected from a group consisting of tin," is incorrect because tin is not an alloy.

In claim 5 it is improper to use the term "including" instead of "consisting of" in claiming a genus expressed as a group consisting of certain specified materials, *Ex parte Dotter*, 12 USPQ 382 (Bd. App. 1931). To further clarify, the term "including", is synonymous with "comprising." See, e.g., *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997).

Claim 5 is grammatically awkward, ambiguous and confusing, and appears to be incorrect.

In order to further continue to afford applicant the benefit of compact prosecution, it is noted that the specification disclosure at page 15, lines 11-15, is similar to the language of claim 5.

In claim 9, the scope of the limitation "boundaries of loose tolerance" cannot be determined because the term "loose" is a vague relative term of degree for which the disclosure provides no clear standard for measuring the degree, or it is not apparent if the degree is limited by the disclosure, and one of ordinary skill in the art in view of the prior art and the

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status of the art would not otherwise be reasonably apprised of the scope of the term.

In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1, 2, 4-14 and 16 are rejected under 35 U.S.C.

103(a) as being unpatentable over the combination of Kinghorn (5454929), Asher (Re. 34,227) and Shiga (4,529,667).

At column 2, lines 28-41, and column 5, line 13 to column 9, line 47, Kinghorn teaches the following:

1. A leadframe for use in the assembly of integrated circuit chips, comprising: a base metal structure 10 having an adherent layer 48 comprising nickel covering said base metal; an adherent layer 46 of lead-free solder on said nickel layer, selectively covering areas 12 of said leadframe suitable for parts attachment; an adherent layer 44 comprising palladium on said nickel layer, selectively covering areas 16 of said leadframe suitable for bonding wire attachment.

2. The leadframe according to 1 wherein said base metal is copper, copper alloy, brass, aluminum, iron-nickel alloy, or invar.

4. The leadframe according to 1 wherein said nickel layer has a thickness in the range from about 0.5 to 3.0 μm .

5. The leadframe according to 1 wherein said solder layer comprises alloys selected from a group consisting of tin, tin alloys including tin/copper, tin/indium, tin/silver, and tin/bismuth, and conductive adhesive compounds.

6. The leadframe according to 5 wherein said solder

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alloy has a reflow temperature compatible with wire bonding temperatures and molding temperatures.

7. The leadframe according to 5 wherein said solder layer has a thickness in the range from about 0.7 to 9.0 μm .

8. The leadframe according to 1 wherein said palladium layer has a thickness in the range from about 5 to 250 nm.

9. The leadframe according to 8 wherein said palladium layer covers selective areas having boundaries of loose tolerance.

12. The leadframe according to 1 wherein said heating includes the temperatures and times employed for the processes of chip attaching, wire bonding, and device encapsulating.

13. A leadframe for use with integrated circuit chips comprising: a base metal structure 10 having a plated layer 48 of nickel fully covering said base metal; a plated layer 46 of lead-free solder on said nickel layer, selectively covering areas 12 of said leadframe suitable for parts attachment; a plated layer 44 of palladium on said nickel layer, selectively covering areas 16 of said leadframe suitable for bonding wire attachment.

14. A leadframe for use with integrated circuit chips comprising: a base metal structure having a plated layer of nickel fully covering said base metal; a plated layer of solder on said nickel layer, selectively covering areas of said

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leadframe suitable for parts attachment; a plated layer of palladium on said nickel layer, selectively covering areas of said leadframe suitable for bonding wire attachment; a plated layer of silver on said solder and said palladium layers; and said solder having a reflow temperature above semiconductor assembly temperatures.

To further clarify the teaching that the palladium layer covers areas having boundaries of loose tolerance, a degree of tolerance is an inherent property of the boundaries of Kinghorn, and the tolerance of the boundaries is loose relative to any given tighter tolerance.

To further clarify the teaching of the solder having a reflow temperature above semiconductor assembly temperatures, attention is directed to column 6, lines 16-29, wherein Kinghorn teaches the solder having a reflow temperature above semiconductor assembly temperatures limited by "the low reflow temperature of tin/lead solder of 183 degrees centigrade."

However, Kinghorn does not appear to explicitly teach an adherent layer of silver on the solder and palladium layers, the silver being thin enough for complete dissolution into the solder upon heating, or a plated layer of silver on the solder and palladium layers, the silver being thin enough for complete dissolution into the solder upon heating or that the solder and

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the silver covering tin/copper solder can be dissolved into soldering media without melting, or the following:

10. The leadframe according to 1 wherein said silver layer has a thickness in the range from about 20 to 2500 nm.

11. The leadframe according to 10 wherein said silver layer has a preferred thickness from about 1200 to 1500 nm.

16. The leadframe according to 14 wherein said soldering media include solder pastes and solder waves.

Nevertheless, at column 1, lines 45-57, and column 4, lines 56-65, Asher teaches a leadframe for use in the assembly of integrated circuit chips comprising a base metal structure having an adherent layer of solder selectively covering areas of the leadframe suitable for parts attachment, and an adherent layer comprising palladium selectively covering areas 28 of the leadframe suitable for bonding wire attachment, wherein the palladium does not cover the solder in the areas suitable for parts attachment. In addition, it would have been obvious to combine the product of Asher with the product of Kinghorn because it would reduce the use of relatively expensive palladium.

Also, at column 1, line 8 to column 10, last line, Shiga teaches an adherent layer of silver on solder and palladium layers, the silver being thin enough for complete dissolution

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into the solder upon heating, a plated layer of silver on the solder and palladium layers, the silver being thin enough for complete dissolution into the solder upon heating, the tin/copper solder and the silver covering the solder can be dissolved into soldering media without melting, wherein the soldering media include solder pastes and solder waves, and wherein the silver layer has a thickness from about 1200 to 1500 nm. Moreover, it would have been obvious to combine the product of Shiga with the product of the combination of Kinghorn and Asher because it would improve corrosion resistance.

To further clarify the teaching of the silver being thin enough for complete dissolution into the solder upon heating, it is noted that, as cited, Shiga teaches that the Sn solder is "soluble in silver," and "diffuse[s] rapidly into the silver coating," and, "stably diffuse[s] into the silver."

In any case, the product of the combination of applied prior art is structurally identical to the claimed product; therefore, it inherently possesses the properties of the claimed product.

To further clarify the teaching that the solder and the silver covering the solder can be dissolved into soldering media without melting, wherein the soldering media include solder pastes and solder waves, the product of the combination of

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applied prior art is structurally identical to the claimed product; therefore, it inherently possesses this claimed capability.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kinghorn (5454929), Asher (Re. 34,227) and Shiga (4,529,667), or in the alternative, further in combination with Imanishi (6332268).

The combination of Kinghorn, Asher and Shiga is applied for the same reasons it was applied to claim 2.

However, the applied prior art does not appear to explicitly teach the following:

3. The leadframe according to 2 wherein said base metal has a thickness between about 100 and 250 μm .

Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the product would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular

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unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

In the alternative, at column 12, lines 10-12, Imanishi teaches this limitation. Moreover, it would have been obvious to combine the product of Imanishi with the product of the applied prior art because it would provide a leadframe.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kinghorn (5454929), Asher (Re. 34,227) and Shiga (4,529,667), or in the alternative, further in combination with Yanada (2002/0104763).

The combination of Kinghorn, Asher and Shiga is applied for the same reasons it was applied to claim 14.

However, the applied prior art does not appear to explicitly teach the following:

15. The leadframe according to 14 wherein said tin/copper solder has between about 2 % and 15 % copper.

Regardless, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and

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ascertainable by routine experimentation and optimization to choose the particular claimed tin and copper percentage limitations because applicant has not disclosed that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the product would possess utility using another percentage. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See MPEP 2144.05(II): "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'" In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969), Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989), and In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990). As set forth in MPEP 2144.05(III), "Applicant can rebut a prima facie case of

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obviousness based on overlapping ranges by showing the criticality of the claimed range. 'The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.' In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results."

In any case, at paragraph [0052], Yanada teaches these limitations. Furthermore, it would have been obvious to combine the product of Yanada with the product of the applied prior art because it would provide a tin/copper solder.

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions similar to the instant invention.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to Group 2800 Customer Service whose telephone number is 703-306-3329.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/3087724.

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A handwritten signature in cursive script, appearing to read 'JED E. Graybill'.

David E. Graybill
Primary Examiner
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D.G.
11-Dec-02